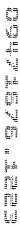
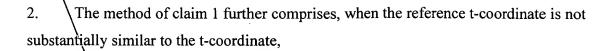
Claims

What is claimed is:

- method for successive linear approximation to obtain a specific point of a non-5 linear monotonic function, the method comprises the steps of:
 - obtaining a t-coordinate of the specific point; a)
- selecting a minimum n-coordinate and a maximum n-coordinate to bound an n-10 b) coordinate of the specific point;
 - c) obtaining a minimum t-coordinate based on the minimum n-coordinate;
- obtaining a maximum t-coordinate based on the maximum n-coordinate; 15 d)
 - e) deriving a linear reference between the minimum n and t coordinates and the maximum n and t coordinates;
- 20 obtaining a reference n-coordinate lying on the linear reference based on the tf) coordinate;
 - determining a reference t-coordinate lying on the non-linear monotonic function g) based on the reference n-chordinate;
 - determining whether the reference t-coordinate is substantially similar to the th) coordinate; and
- when the reference t-coordinate is substantially similar to the t-coordinate, i) determining that the reference n-coordinate is substantially equal to the n-coordinate, 30 wherein the t-coordinate and the n-coordinate define the specific point.





determining whether the reference t-coordinate is greater than the t-coordinate;

when the reference t-coordinate is greater than the t-coordinate, redefining the maximum t-coordinate to equal the reference t-coordinate to produce a first maximum t-coordinate;

determining a first maximum n-coordinate lying on the non-linear monotonic function based on the first maximum t-coordinate;

deriving a first linear reference between the minimum n and t coordinates and the first maximum n and t coordinates;

- obtaining a first reference n-coordinate lying on the first linear reference based on the t-coordinate;
- determining a first reference t-coordinate lying on the non-linear monotonic function

 20 based on the first reference n-coordinate;

determining whether the first reference t-coordinate is substantially similar to the t-coordinate; and

- when the first reference t-coordinate is substantially similar to the t-coordinate, determining that the first reference n-coordinate is substantially equal to the n-coordinate.
 - 3. The method of claim 1 further comprises, when the reference t-coordinate is not substantially similar to the t-coordinate,

determining whether the reference t-coordinate is less than the t-coordinate;

when the reference t-coordinate is less than the t-coordinate, redefining the minimum t-coordinate to equal the reference t-coordinate to produce a first minimum t-coordinate;

determining a first minimum n-coordinate lying on the non-linear monotonic function based on the first minimum t-coordinate;

deriving a first linear reference between the first minimum n and t coordinates and the maximum n and t coordinates;

obtaining a first reference n-coordinate lying on the first linear reference based on the t-coordinate;

determining a first reference t-coordinate lying on the non-linear monotonic function based on the first reference n-coordinate;

determining whether the first reference t-coordinate is substantially similar to the t-coordinate; and

- when the first reference t-coordinate is substantially similar to the t-coordinate, determining that the first reference n-coordinate is substantially equal to the n-coordinate.
 - 4. The method of claim 1, wherein the t-coordinate comprises a time stamp value associated with a beginning of a video program stored in a video file and wherein the n-coordinate comprises a byte count value associated with the beginning of the video program.
 - 5. The method of claim 4, wherein the video file comprises MPEG video data and MPEG audio data.



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- Amethod for successive linear approximation to obtain a specific point of a non-linear monotonic function, wherein the specific point is defined by a t-coordinate and an n-coordinate, the method comprises the steps of:
- 5 a) obtaining a t-coordinate of the specific point;
 - b) selecting a minimum point and a maximum point that bound the specific point, wherein the minimum point and the maximum point lie on the non-linear monotonic function;
 - c) deriving a linear reference between the minimum and the maximum points;
 - d) obtaining a reference n-coordinate lying on the linear reference based on the t-coordinate;
 - e) determining a reference t-coordinate lying on the non-linear monotonic function based on the reference n-coordinate;
 - f) determining whether the reference t-coordinate is substantially similar to the t-coordinate;
 - g) when the reference t-coordinate is not substantially similar to the t-coordinate, redefining the minimum point or the maximum point based on the reference t-coordinate;
- 25 h) repeating steps (b) through (g) until the reference t-coordinate is substantially similar to the t-coordinate; and
 - i) when the reference t-coordinate is substantially similar to the t-coordinate, determining that the reference n-coordinate is substantially equal to the n-coordinate, wherein the t-coordinate and the n-coordinate define the specific point.

7. The method of claim 6, wherein step (g) further comprises, when the reference tcoordinate is not substantially similar to the t-coordinate,

redefining the minimum point to correspond to the reference t-coordinate and the reference \(\frac{1}{2}\)-coordinate, when the reference t-coordinate is less than the t-coordinate.

- 8. The method of claim 6, wherein step (g) further comprises, when the reference tcoordinate is not substantially similar to the t-coordinate,
- 10 redefining the maximum point to correspond to the reference t-coordinate and the reference n-coordinate, when the reference t-coordinate is greater than the t-coordinate.
 - 9. The method of claim 6, wherein the t-coordinate comprises a time stamp value associated with a beginning of a video program stored in a video file and wherein the ncoordinate comprises a byte count value associated with the beginning of the video program.
 - 10. The method of claim 9, wherein the video file comprises MPEG video data and MPEG audio data.

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An apparatus for successive linear approximation to obtain a specific point of a non-linear monotonic function, the apparatus comprises:

a processing module; and

memory operably coupled to the processing module, wherein the memory includes operational instructions that cause the processing module to: (a) obtain a t-coordinate of the specific point; (b) select a minimum n-coordinate and a maximum n-coordinate to bound an n-coordinate of the specific point; (c) obtain a minimum t-coordinate based on the minimum n-coordinate; (d) obtain a maximum t-coordinate based on the maximum n-coordinate; (e) derive a linear reference between the minimum n and t coordinates and the maximum n and t coordinates; (f) obtain a reference n-coordinate lying on the linear reference based on the t-coordinate; (g) determine a reference t-coordinate lying on the non-linear monotonic function based on the reference n-coordinate; (h) determine whether the reference t-coordinate is substantially similar to the t-coordinate; and (i) when the reference t-coordinate is substantially similar to the t-coordinate, determine that the reference n-coordinate is substantially equal to the n-coordinate, wherein the t-coordinate and the n-coordinate define the specific point.

12. The apparatus of claim 11, wherein the memory further comprises operational instructions that cause the processing module to, when the reference t-coordinate is not substantially similar to the t-coordinate,

determine whether the reference t-coordinate is greater than the t-coordinate;

when the reference t-coordinate is greater than the t-coordinate, redefine the maximum t-coordinate to equal the reference t-coordinate to produce a first maximum t-coordinate;

determine a first maximum n-coordinate lying on the non-linear monotonic function based on the first maximum t-coordinate;

derive a first linear reference between the minimum n and t coordinates and the first maximum n and t coordinates;

obtain a first reference n-coordinate lying on the first linear reference based on the t-coordinate;

determine a first reference t-coordinate lying on the non-linear monotonic function based on the first reference n-coordinate;

determine whether the first reference t-coordinate is substantially similar to the t-coordinate; and

when the first reference t-coordinate is substantially similar to the t-coordinate, determine that the first reference n-coordinate is substantially equal to the n-coordinate.

- 13. The apparatus of claim 11, wherein the memory further comprises operational instructions that cause the processing module to, when the reference t-coordinate is not substantially similar to the t-coordinate,
- 20 determine whether the reference t-coordinate is less than the t-coordinate;

when the reference t-coordinate is less than the t-coordinate, redefine the minimum t-coordinate to equal the reference t-coordinate to produce a first minimum t-coordinate;

determine a first minimum n-coordinate lying on the non-linear monotonic function based on the first minimum t-coordinate;

derive a first linear reference between the first minimum n and t coordinates and the maximum n and t coordinates;

obtain a first reference n-coordinate lying on the first linear reference based on the tcoordinate;

determine a first reference t-coordinate lying on the non-linear monotonic function based on the first reference n-coordinate;

determine whether the first reference t-coordinate is substantially similar to the tcoordinate: and

- when the first reference t-coordinate is substantially similar to the t-coordinate, determine 10 that the first reference n-coordinate is substantially equal to the n-coordinate.
 - The apparatus of claim 11, wherein the t-coordinate comprises a time stamp value 14. associated with a beginning of a video program stored in a video file and wherein the ncoordinate comprises a byte count value associated with the beginning of the video program.
 - The apparatus of claim 14, wherein the video file comprises MPEG video data 15. and MPEG audio data.

An apparatus for successive linear approximation to obtain a specific point of a non-linear monotonic function, the apparatus comprises:

a processing module; and

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memory operably coupled to the processing module, wherein the memory includes operational instructions that cause the processing module to: (a) obtain a t-coordinate of the specific point; (b) select a minimum point and a maximum point that bound the specific point, wherein the minimum point and the maximum point lie on the non-linear monotonic function; (c) derive a linear reference between the minimum and the maximum points; (d) obtain a reference n-coordinate lying on the linear reference based on the t-coordinate (e) determine a reference t-coordinate lying on the non-linear monotonic function based on the reference n-coordinate; (f) determine whether the reference t-coordinate is substantially similar to the t-coordinate; (g) when the reference t-coordinate is not substantially similar to the t-coordinate, redefine the minimum point or the maximum point based on the reference t-coordinate; (h) repeat steps (b) through (g) until the reference t-coordinate is substantially similar to the t-coordinate; and (i) when the reference t-coordinate is substantially similar to the t-coordinate, determine that the reference n-coordinate is substantially equal to the n-coordinate, wherein the t-coordinate and the n-coordinate define the specific point.

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17. The apparatus of claim 16, wherein the memory further comprises operational instructions that cause the processing module to, when the reference t-coordinate is not substantially similar to the t-coordinate,

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redefine the minimum point to correspond to the reference t-coordinate and the reference n-coordinate, when the reference t-coordinate is less than the t-coordinate.

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18. The apparatus of claim 16, wherein the memory further comprises operational instructions that cause the processing module to, when the reference t-coordinate is not substantially similar to the t-coordinate,

redefine the maximum point to correspond to the reference t-coordinate and the reference n-coordinate, when the reference t-coordinate is greater than the t-coordinate.

- 19. The apparatus of claim 16, wherein the t-coordinate comprises a time stamp value associated with a beginning of a video program stored in a video file and wherein the n-coordinate comprises a byte count value associated with the beginning of the video program.
- 10 20. The apparatus of claim 19, wherein the video file comprises MPEG video data and MPEG audio data.

